International Livestock Research Institute

Training course report

Scientific misconduct

3 October 2018

CGIAR

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INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

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Compiled by Tezira Lore

Citation

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Animal scientist, Nobel Prize Laureate for Physiology or Medicine–1996

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ILRI has offices in East Africa • South Asia • Southeast and East Asia • Southern Africa • West Africa

Contents

Background

Doing and publishing science is ever more complicated and the pressure to succeed more intense. But a wrong step can end a promising scientist's career.

"Is it acceptable to send same paper to two journals at the same time? Should I publish in *Nature* and *Science*? Has my supervisor stolen my place on this paper? Should I share my raw data? If I use the same paragraphs to describe how I extracted DNA in two papers is that auto-plagiarism? Is it wrong?" These questions express the concerns that scientists often have in relation to the ethics of research publishing.

Ethics and values of science change and, more importantly, there are ever more efficient tools to detect research misconduct. Research misconduct involves, *inter alia*, deliberate falsification, fabrication or plagiarism in conducting or reporting research. Plagiarism test has become a key review criterion for most graduate and scholarship research programs.

This short training course on science fraud was aimed at summarizing the main types of research misconduct and how to detect them. It also provided an update on recent CGIAR initiatives to fight science fraud and build a culture of science excellence and integrity.

Training summary

The one-day training course was held on Wednesday 3 October 2018 at the Nairobi campus of the International Livestock Research Institute (ILRI). It was organized by ILRI's Capacity Development Unit and facilitated by Delia Grace Randolph, program leader (joint) of ILRI's Animal and Human Health program. The target group comprised ILRI staff, graduate fellows and interns. Interested staff and students from hosted institutions were also invited to participate. A total of 23 people were trained (11 female, 12 male); they were primarily drawn from research programs and departments within ILRI with one participant from the University of Nairobi. Five of the participants took part via WebEx. The list of trainees is indicated in Appendix 1.

Training material

The training material comprised a series of presentations as listed below. Details of the presentation slides are in Appendix 2.

1. Claiming causality
2. Is it plagiarism?
3. Mitigating risk of science fraud
4. Predatory journals
5. Journal evaluation tool

Training evaluation

At the end of the workshop, a brief questionnaire was administered to the trainees to evaluate their learning experiences and the parts of the workshop they found most useful or interesting. The training evaluation questionnaire is shown in Appendix 3 and the evaluation summary is indicated below.

Q1: What are the three most important categories of science fraud? Please tick three and only three.

1.	Plagiarism	16
2.	Publishing in a predatory journal	0
3.	Fabrication	16
4.	Falsification	15
5.	Gift writing	1

Q2: What does HARK stand for? Write out in full.

Correct answers	11
Incorrect answers	5

Q3: If a paper doesn't have an impact factor, does that mean it is predatory?

Yes	1
No	15

Q4: How did you find the length of the course?

Too long	0
Too short	5
About right	11

Q5: How did you find the difficulty of the material?

Too hard	0
Too easy	0
About right	16

Q6: What was the most important or interesting thing you learned?

- Forms of scientific misconduct
- What not to do in research work e.g. types of fraud
- Claiming causality
- Learning how to avoid scientific misconduct
- How to appropriately claim causality
- pHacking and HARKing, analyzing composite study data
- HARKING, causality
- pHacking, how to identify predatory journal, harking
- I have learnt about p.hacking and HARKING; things I didn't know were unethical
- RCT and P.Hacking
- Dangers of plagiarism, fabrication and falsification together with importance of writing as well as I can read
- How to identify predatory journals
- Patchworking is wrong though I have always used it before
- Different plagiarism tools
- The Equator.net amazed me; I appreciate it will change my research
- How to identify good journals that are not predatory
- Plagiarism
- How to flag predatory journals
- Various guidelines to follow journals before publishing my work and to ensure that they are not predatory
- Confounding and causality

Appendix 1: List of participants

No.	Name	Program/department	Sex (M/F)	Country of origin
1	Francis Ole Tumanka	Livestock Genetics	M	Kenya
2	Mercy Cianjoka	Animal and Human Health	F	Kenya
3	Agraw Amane	Livestock Genetics	M	Ethiopia
4	Adebabay Kabede Belew*	Livestock Genetics	M	Ethiopia
5	Sophia Ngala	University of Nairobi	F	Kenya
6	Mercy Sinkiyan Kepue	Biosciences eastern and central Africa (BecA)–ILRI hub	F	Kenya
7	Peninah Yumbya	BecA–ILRI hub	F	Kenya
8	Erick Mwita Marwa	Livestock Genetics	M	Kenya
9	Fredrick Nganga	BecA–ILRI hub	M	Kenya
10	Endashaw Terefe*	Livestock Genetics	M	Ethiopia
11	Barrack Wanjawa*	Engineering	M	Kenya
12	Eunice Machuka	BecA–ILRI hub	F	Kenya
13	Charity Kinyua	Animal and Human Health	F	Kenya
14	Daniel Mutiso Nthiwa	Animal and Human Health	M	Kenya
15	Nicholas Ngwili	Animal and Human Health	M	Kenya
16	Hussein Abkallo	Animal and Human Health	M	Kenya
17	Fikirte Getachew*	Animal and Human Health	F	Ethiopia
18	Solomon Gizaw*	Impact at Scale	M	Ethiopia
19	Desalew Tadesse Tegegne*	Livestock Genetics	M	Ethiopia
20	Winfred Sila	Livestock Genetics	F	Kenya
21	Caroline Muthike	BecA–ILRI hub	F	Kenya
22	Esther Kihoro	Sustainable Livestock Systems	F	Kenya
23	Faith Mutavi	Sustainable Livestock Systems	F	Kenya

*Joined via WebEx

Appendix 2: Training materials

Claiming causality

Claiming Causality

Delia Grace
International Livestock Research Institute

Objectives

- After this session the participants should understand what is p-hacking, harking.
- Participants should understand when to test for multiple outcomes and how to make claims of causality

Scientific method

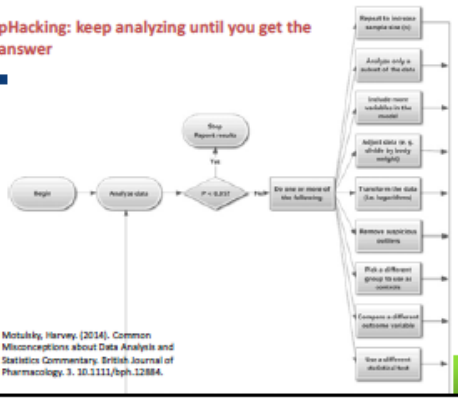
Put the following in correct order.

1. Collect data on X and then on Y.
2. Observe a phenomenon, generally some type of association or cause/effect relationship (e.g., X causes Y).
3. Analyze this data to either reject your hypothesis (X does not cause Y) or retain your hypothesis to investigate further.
4. Generate a hypothesis describing the mechanism–the why–that connects X with Y.

null hypothesis significance testing (NHST)

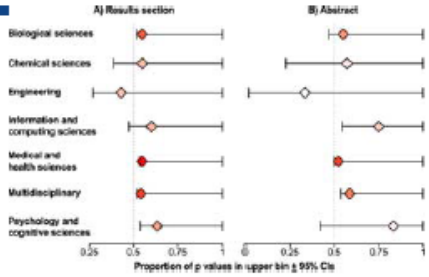
- Ho: Drinking one cup of coffee or more a day is not associated with bowel cancer
- Estimate the association e.g. if you drink =>1 coffee a day the chance of having bowel cancer is 10% higher than those who drink <1 cup
- Then compute the probability (i.e., p) of finding an effect at least or more extreme than the observed finding if the null hypothesis is true
- p is 0.01 so 1 in a hundred chance of finding bowel cancer is increased by 10% or more if null hypothesis is true

pHacking: keep analyzing until you get the answer



Motulsky, Harvey. (2014). Common Misconceptions about Data Analysis and Statistics Commentary. British Journal of Pharmacology. 3. 10.1111/bph.12884.

The strength of p-hacking is presented as the proportion of p-values in the upper bin ($0.045 < p < 0.05$) with one-tailed 95% confidence intervals



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4359000/

HARKING- Hypothesizing after results are known

A combination of multiple comparisons and p-hacking

Easy to get when data-sets are small

Often produce counter-intuitive results so easy to publish

Usually do not claim a ex ante hypothesis but imply it

Confounders

- Ice cream causes drowning
- Storks cause babies
- Grey hair causes heart attacks

Multiple comparisons

- Multiple outcomes – how many outcomes for impact of ECF?
- Sub-group analysis – suggest some sub-groups for an intervention to reduce ECF?

Number of Tests[a]	Probability ≥1 t-test Is Statistically Significant
1	.05
5	.23
10	.40
20	.64
50	.92

[a]Assumes independent tests

Many ways of adjusting – but they reduce the chances of finding real effects (statistical power)

- Bonferroni: Compare p-values to (.05 / # of tests)
- Fisher's LSD, Holm (1979), Sidak (1967), Scheffe (1959), Hochberg (1988), Rom (1990), Tukey (1953)
- Resampling methods (Westfall and Young 1993)
- Benjamini-Hochberg (1995)

Solution

- Confirmatory component: primary outcome- addresses central Hypotheses. Must adjust for multiple comparisons
- Exploratory component: secondary outcomes. Identifies impacts for future study. Findings are preliminary

Creative causality

Non experimental designs can only suggest

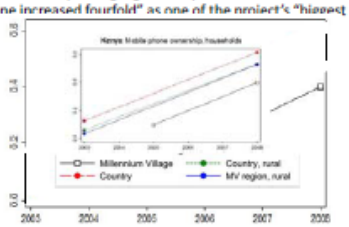
- **Can't control completely with a regression model or propensity score**
  - **–Models can only say might**
- **Can't get causality from a cross sectional (with –without) study**
- **Can't get causality from a before and after study**

#LivestockAgenda

Before and after

- MVP mid-term evaluation report highlights "Proportion of households that own a mobile phone increased fourfold" as one of the project's "biggest impacts" in Bar-S

http://blogs.worldbank.org/africacan/the-millennium-villages-project-continues-to-systematically-overstate-its-effects



Observational studies

- **Book "Uncontrolled" (Manzi) summarized: 90% of large RCT replicated**
  - **as compared to only 20% of non-RCT**
- **Young and Carr looked at 52 claims made in medical observational studies**
  - **NONE (zero) of the claims replicated in RCTs,**
  - **5 claims were stat-sig in the opposite direction in the RCT**
  - **Their summary: any claim coming from a non-RCT is most likely to be wrong**
- **Even well-controlled, published non-RCT have been reversed by RCT**

Cross-sectional studies

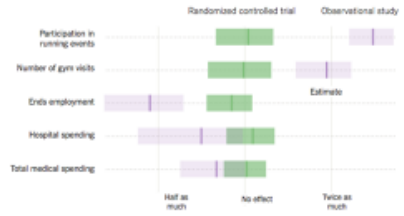
- Many studies show an association between red and processed meat and increases in total mortality, cancer mortality and CVD mortality even after statistical control
- Recent, large, multi-country study found high CHO intake linked to worse total mortality and CVD outcomes, high fat intake associated with lower risk. Animal protein was associated with lower risk of total mortality, plant protein was not.
- A very large observational study found red meat increased the risk total mortality and white meat decreased it. Is red meat and white meat so different, or are these divergent outcomes a product of who eats red meat vs who eats white meat?

Adjusting in observational trials

- Adjust or control for variables that might affect the result
- Example: wellness programs at work generally show positive results. But almost all studies are observational and compare those who participate and those who don't.
- Recently results of a large trial of a wellness program in USA was published and analysed 3 ways
  - RCT: compared randomly assigned to intervention with control
  - Observational study: compared those who participate to those who didn't
  - Observational study adjusted for confounders

https://www.nytimes.com/2018/08/06/upshot/employer-wellness-programs-randomized-trials.html

How the Illinois Wellness Program Affected . . .



Source: What Do Workplace Wellness Programs Do? Evidence from the Illinois Workplace Wellness Study

- In one analysis, they controlled for sex, age, race, salary and status as faculty or staff. They still found that the results of the observational analysis were significant for all the outcomes discussed above.
- In an even more heavily controlled analysis, they used machine learning to decide whether to control for even more variables, including (but not limited to) past health, smoking and drinking status; pre-intervention exercise; medication use; and sick days taken.

Creative causality

RCT can be done wrong too

- **Must be controlled, controls must be random**
- **Must follow best practice guidelines**
- **Comparisons require corrections**
- **Can't infer causality from a secondary outcome**

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Doing it right

- Do a RCT if you want to make claims about cause/ impact
- Clearly specify a single primary outcome of the study or include few primary outcomes along with a strategy to account for multiplicity,
- Specify a limited number of secondary outcomes, along with a justification
- Published protocol in a recognized trial registry prior to the start of trial analysis,
- Ensure that the discussion of outcomes is consistent in the protocol, abstract, methods, results and tables, and,
- Use principled approaches to account for multiple outcomes to help minimize the chance of spurious results due to multiplicity and help to ensure maximal gain of evidence-based knowledge accrues from these important and expensive trials.

Composite study on nutrition sensitive agricultural interventions

- Agricultural intervention in villages to improve nutrition of children
- Provided seeds, poultry, training, BCC

- Cluster randomised controlled trial
- Outcomes: HAZ, WHZ, wasting, stunting, Hb, anaemia, diarrhoea, cognitive performance.

- No significant effect on HAZ, WHZ
- Marginally significant on Hb – p=0.06
- No change anaemia, significant improvement cognition
- Significant effect on diarrhoea
- Girls between 6 months and 12 had significantly reduced stunting

Is it plagiarism?

Authorship and plagiarism

Johanna Lindahl
Delia Grace
International Livestock Research Institute

Objectives

- **After this session the participants should understand what are the requirements for being an author of a biomedical paper**
- **They should understand different types of plagiarism, how it is detected and why to avoid it**

Authors

- Intellectual and substantial input
- Vancouver criteria established in 1988
- ICJME http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html#two
- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Authors

Should the following get authorship:

1. Supervisors at university or at research institutes
2. Colleagues who provide writing assistance, technical editing, language editing, and proofreading.
3. The head of the lab or the research group in which research takes place
4. Acquisition of funding
5. The person who had the original idea or concept that is being tested

Why should you reference?

- Give credit where it is due
- Help the reader find sources
- Avoid plagiarism
- Intrinsic part of science method

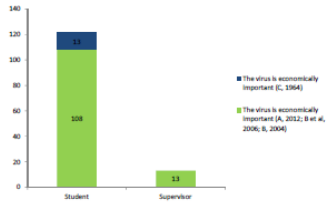
How to reference?

- In a paper by A (2012) you can find the following statement "The virus is considered an important economic pathogen in pigs (B et al 2006). How can you reference this?
- If you had read B et al, 2006, you would have found a reference to a book by B, 2004. B, 2004 refers to C et al. 1964. C had actually done the research on this. How would you reference this?

The virus is economically important (A, 2012)
The virus can be economically important (B et al, 2006)
The virus is economically important (A, 2012; B et al, 2006)
It is well known that the virus is economically important.
I have to read B et al 2006 before citing.

What to reference?

- The original study?
- The newest study?
- A review?



Which of the following references would make you believe more in the statement?

The virus is economically important (A, 2012; B et al, 2006; B, 2004)

The virus is economically important (C, 1964)

Plagiarism

Plagiarism is when you take the work or the text of someone else, and pretend it is your own creation or writing. It is sometimes referred to as theft of intellectual material, and is considered a form of cheating at universities.
Wikipedia defines plagiarism as: "Plagiarism is the "wrongful appropriation" and "stealing and publication" of another author's "language, thoughts, ideas, or expressions" and the representation of them as one's own original work"
Swedish University of Agricultural Sciences defines it as "Plagiarism is when someone uses the work or text of another without clearly marking that it is someone else's work." http://www.slu.se/en/library/search/search-and-writers-guide/copyright-and-plagirism/what-are-cheating-and-plagiarism/

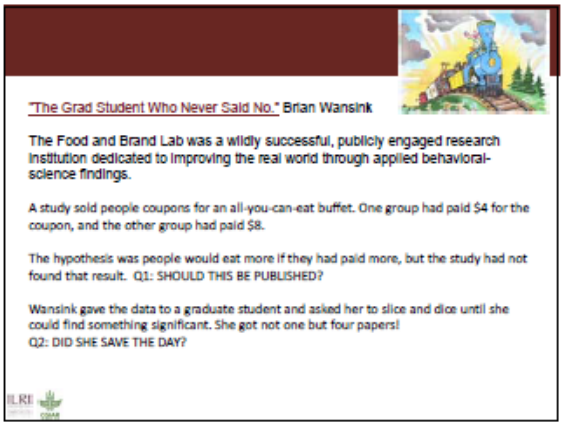
Self-plagiarism

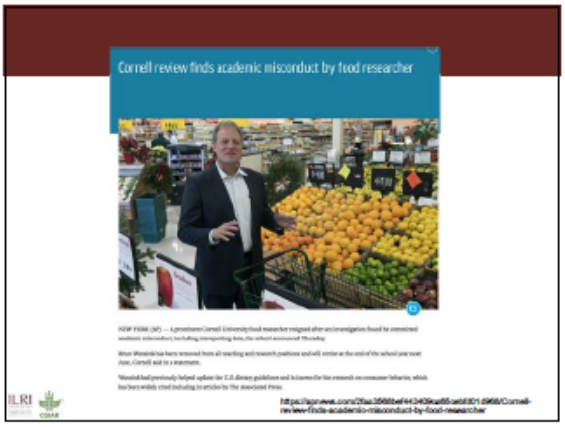
Self-plagiarism is when you copy text that you have already written somewhere else.
Wikipedia defines self-plagiarism as "the reuse of significant, identical, or nearly identical portions of one's own work without acknowledging that one is doing so or without citing the original work"

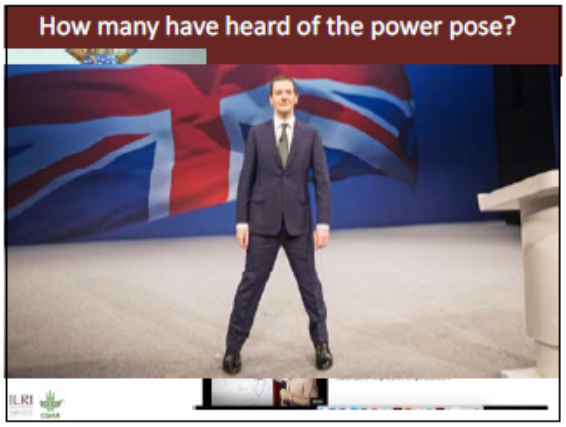
Plagiarism or cheating or is it ok?

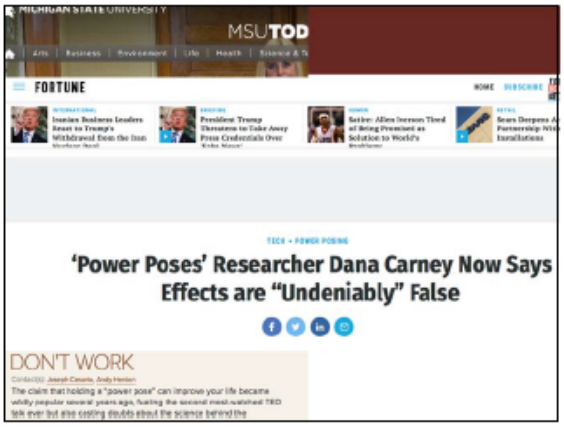
	This is ok	This is plagiarism	This is cheating, but not plagiarism
I pay a friend to write some parts for me in a paper I will submit as my work			
I buy a paper or thesis from someone or from the internet and present it as my work			
I find some text in a paper on internet and I copy it with quotation marks and a reference			
I ask someone to read my paper and correct it before handing it in			
I copy text from a paper I find without a reference, so it looks like I have written it			
I copy text from what I have already written myself in another paper			
I copy text from someone, without a reference but I change some words			
I copy a picture from someone's paper and I put a reference to it.			

Mitigating the risk of science fraud









Textual re-use is repeating material from your previous work in more recent work.
Is this okay?

Patchwork writing is a strategy often used by inexperienced writers and English learners. They find portions of text that say what they want to say and combine them. This is not considered plagiarism on EPDs?
Would you recommend it?

Scientific Fraud

The U.S. National Science Foundation defines three types of research misconduct: fabrication, falsification, and plagiarism.

- **Fabrication** refers to making up results and, recording or reporting them.
- **Falsification** refers to manipulating research materials, equipment, or processes or changing or omitting data or results such that the research is not accurately represented in the research record.
- **Plagiarism** refers to the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

The draft CGIAR considers other types of research misconduct include:

- The violation of ethical standards regarding human and animal experiments
- Ghost-writing and Gift-writing
- The failure to publish significant findings due to the results being averse to the interests of the researcher or his/her sponsor(s)
- Bare assertions or making entirely unsubstantiated claims

Q. Have you encountered these? How many of them?

Why not to do it?

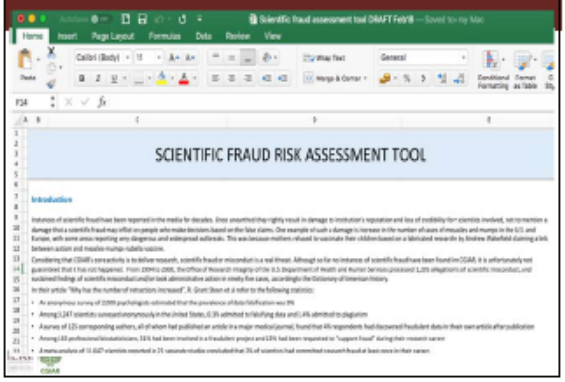
- Plagiarism -EPD: turnitin, ETBlast
- Data fraud: Benford's law; open data
- Image fraud: Figure element reuse
- Analysis fraud: TIVA, SPRITE, GRIM, GRIMMER
- Journal fraud: lists & guidelines
- General fraud: Peer-review; press; data thugs

How not to do it.

- Culture
- Time with students
- Training courses
- Guidelines and tools
  - http://www.equator-network.org/library/translations-of-reporting-guidelines/
  - AMNH Flagship AAD publication and conference guide
- Audits
- Evidence

Q: What tools, guidelines are you using/aware of?

Heads of Internal Audit Community of Practice (IACoP)



1. What level are we at?	Level (1-5)
Professional, ethical and legal frameworks – Have standards of research conduct been articulated, documented and communicated? Are ethical issues being addressed? Are legal requirements for research conduct fully understood and incorporated into research processes? Are funders' requirements understood and incorporated into research processes? Are authorship guidelines developed? Are IP policies in place? Are science quality assurance programs established? Is there a conflict of interest policy? Are awareness and training programs for researchers in place?	
Research conduct and data management – Are research activities adequately planned? Are quality controls applied throughout the scientific research process of handling samples and materials, facilities and equipment, documentation, research work record and data? Are data management processes developed and are being followed? Are research activities transparent? Do researchers have adequate access to the research data and results? Are partners' research ethics and conduct reviewed as part of the research partner selection process?	
Oversight – Is there adequate oversight over the scientific research process? Is there an effective and independent science committee? Are adequate measures put in place to understand partners' research processes and spot potential misconduct?	
Publications – Are there rigorous review processes before research results are published? Is there a process to assess the quality of peer reviewers? Is there a process to deal with retractions and learn from them? Is there a process defining how/when a research should be replicated?	
Human resources – Are there adequate controls to check academic credentials of the incoming researchers? Are roles and responsibilities of researchers clearly defined? Is there a whistleblowing policy that allows researchers to report potential misconduct? Is there a process to define how scientific misconduct will be investigated/responded to?	

ILRI CGIAR

Task Force to review ILRI's policies and procedures for mitigating scientific fraud.

Chaired by Joanna Lindahl and the other members are Wellington Ekaya, Lance Robinson, Lei Sun, Sirak Bahta and Jane Poole. The Task Force will review our current policies and procedures , identify any gaps and make recommendations to management on any modifications/improvements that are requires to minimize the risk of scientific fraud in ILRI. It is expected that it will report by the end of 2018.

ILRI CGIAR

better lives through livestock

ilri.org

ILRI thanks all donors and organizations who globally supported its work through their contributions to the CGIAR system

Patron Professor Peter C Doherty AC, FAA, FRS
Animal scientist, Nobel Prize Laureate for Physiology or Medicine - 1996

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Predatory journals

PREDATORY JOURNALS

Delia Grace

International Livestock Research Institute

Objectives

- After this session the participants should understand about "predatory" "fake" "dubious" and "vanity" journals and why and how to identify and avoid them

Letter from the editor

- "Three bibliographical references belong to articles that have been published in what has been identified as "predatory" or "dubious journals", which are in general owned by "predatory publishers". Their single goal is commercial. Most of them do not perform proper peer-reviewing. The published data and information cannot therefore be considered as valid or checked…….. We are not, of course, in any way questioning the good faith of the cited authors. Indeed, all the persons involved in the publication process often miss this issue. It has become a global concern as no region in the world is spared. This is very unfortunate for articles that could have been accepted elsewhere under satisfactory conditions. Thus, unless you have contradicting information, we will remove the following references……."

Journal Evaluation Tool

Introduction. The changing mechanisms of scholarly publishing may make it difficult for you to determine where to publish the results of your research or creative works. In order to assist you in making the best decisions for your work, and to avoid journals that may not be credible, the William H. Hannon Library has developed a rubric for the evaluation of journals. Our focus during the development of this tool was specifically to address the concerns of our Loyola Marymount University faculty about Open Access journals, but this rubric may be applied more broadly to any kind of journal.

The rubric and related scoring sheet have been developed for your use in review a journal you are considering for your work, to determine if it is a credible publication source. The rubric guides you to score the specific criteria in your review, giving each a score, so that at the end of your review you will know if the journal may be a good, fair, or poor choice for your work. Feel free to give weight to any criteria that may be important for your academic area. Ultimately the decision about where to publish your work is up to you and this tool is designed to assist by providing an objective measure of credibility.

How to use the journal evaluation tool

The journal evaluation tool includes two components, the rubric and the scoring sheet:

Step 1: Follow the criteria listed on the rubric. The criteria prompts you to look in the journal and publisher web sites to discern me if there are markers of credibility or any red flags.

Step 2: Look at the Rationale column on the scoring sheet to gauge the importance of each criterion.

Step 3: Categorize each criteria on the rubric into one of three categories: good (receiving a score of 3), fair (a score of 2), or poor (a score of 1).

Step 4: Mark the score for each criterion on the scoring sheet.

Step 5: Determine the final score after you have completed the rubric.

Step 6: Use the Guide to Interpretation at the bottom of the scoring sheet to determine if the total score suggests that the journal is likely a good, fair, or poor choice for publication.

Predatory?

Annan-Prah A., Amewowor D.H.A.K., Osei-Kofi J., Amoono S.E., Akorli S.Y., Saka E., Ndadi H.A., 2011. Street foods: Handling, hygiene and client expectations in a World Heritage Site Town, Cape Coast, Ghana. *African J. Microbiol. Res.*, **5** (13): 1629-1634, doi: 10.5897/AJMR11.199

Tambekar D.H., Kulkarni R.V., Shirsat S.D., Bhagande D.G., 2011. Bacteriological quality of street vended food panipuri: a case study of Amravati city (ms) India. *Biosci. Discov.*, **2** (3): 350-354

Wawa S.A., Sserunjogi M.L., Ogwok P., Mugampoza D., 2009. Risk assessment for the occurrence of *Escherichia coli* 0157:H7 in indigenous fermented milk (Lee Naga a Agbora) produced in Uganda. *Anim. Prod. Res. Adv.*, **5** (2), doi: 10.4314/apra.v5i2.49823

On-line resources

- Blacklists
  - https://beallslist.weebly.com
  - https://www2.cabells.com/about-blacklist
- White lists
  - http://mjl.clarivate.com/cgi-bin/jrnlst/jloptions.cgi?PC=master (previous Thompson –Reuters ISI)
- General resources
  - https://thinkchecksubmit.org

Credit with CGIAR?

- **Ahlberg, S.**, Joutsjoki, V., Laurikkala, S., Varmanen, P. and Korhonen, H. 2017. *Aspergillus flavus* growth inhibition by *Lactobacillus* strains isolated from traditional fermented Kenyan milk and maize products. *Archives of Microbiology* 199(3): 457–464. http://hdl.handle.net/10568/78161
- **Alarcon, P.**, **Fèvre, E.M.**, **Muinde, P.**, **Murungi, M.K.**, **Kiambi, S.**, **Akoko, J.** and Rushton, J. 2017. Urban livestock keeping in the city of Nairobi: Diversity of production systems, supply chains, and their disease management and risks. *Frontiers in Veterinary Science* 4: 171. http://hdl.handle.net/10568/89113
- **Kungu, J.M.**, Dione, M., **Roesel, K.**, Ejobi, F., Ocaido, M. and **Grace, D.** 2017. Assessment of hygiene practices of pork retail outlets in Kampala district, Uganda. *International Food Research Journal* 24(4): 1368–1373. http://hdl.handle.net/10568/83356
- **Alarcon, P.**, **Fèvre, E.M.**, Murungi, M.K., Muinde, P., Akoko, J., **Dominguez-Salas, P.**, Kiambi, S., Ahmed, S., Häsler, B. and Rushton, J. 2017. Mapping of beef, sheep and goat food systems in Nairobi — A framework for policy making and the identification of structural vulnerabilities and deficiencies. *Agricultural Systems* 152: 1–17. http://hdl.handle.net/10568/78395

Take home message

- Write papers the way you want to read them

Journal evaluation tool

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Journal Evaluation Tool

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Journal Evaluation Tool

Introduction: The changing mechanisms of scholarly publishing may make it difficult for you to determine where to publish the results of your research or creative works. In order to assist you in making the best decisions for your work, and to avoid journals that may not be credible, the William H. Hannon Library has developed a rubric for the evaluation of journals. Our focus during the development of this tool was specifically to address the concerns of our Loyola Marymount University faculty about Open Access journals, but this rubric may be applied more broadly to any kind of journal.

The rubric and related scoring sheet have been developed for your use to review a journal you are considering for your work, to determine if it is a credible publication source. The rubric guides you to consider specific criteria in your review, giving each a score, so that at the end of your review you will know if the journal may be a good, fair, or poor choice for your work. Feel free to give weight to any criteria that may be important for your academic area. Ultimately the decision about where to publish your work is up to you and this tool is designed to assist by providing an objective measure of credibility.

How to use the journal evaluation tool
The journal evaluation tool includes two components, the rubric and the scoring sheet:

Step 1: Follow the criteria listed on the rubric. The criteria prompts you to look to the journal and publisher web sites to determine if there are markers of credibility or any red flags.

Step 2: Look at the Rationale column on the scoring sheet to gauge the importance of each criterion.

Step 3: Categorize each criteria on the rubric into one of three categories: good (receiving a score of 3), fair (a score of 2), or poor (a score of 1).

Step 4: Mark the score for each criterion on the scoring sheet.

Step 5: Determine the final score after you have completed the rubric.

Step 6: Use the Guide to Interpretation at the bottom of the scoring sheet to determine if the total score suggests that the journal is likely a good, fair, or poor choice for publication.

The evaluation tool was developed and locally tested at LMU by Marie Kennedy (marie.kennedy@lmu.edu), Shilpa Rele (shilpa.rele@lmu.edu), and Nataly Blas (nataly.blas@lmu.edu).

Journal Evaluation Rubric

Criterion	Good (3)	Fair (2)	Poor (1)
Step 1. Journal evaluation			
Web search for the journal	The journal is within the top 5 entries on the first page of search results and there are no scam alert postings.	The journal is on the first page of search results but not within the top 5 entries and there are no scam alert postings.	The journal is not on the first page of search results or there is at least one scam alert post about the journal.
Journal name	The journal name cannot be confused with another journal.	The journal being evaluated has a name similar to another journal but is able to be distinguished between the two.	The journal being evaluated is unable to be distinguished from another with a similar name.
Editorial board	The editorial board is listed with their full names and institutional affiliation.	The editorial board is listed with their full names only (no affiliation).	There is no editorial board listed.
Review process	The journal states whether it is peer reviewed/edited and has a review policy listed.	The journal states whether it is peer reviewed/edited and has no review policy listed.	The journal does not state whether it is peer reviewed/edited and has no review policy listed.
Conflicts of interest	The journal thoroughly and clearly states a conflicts of interest policy, including how it will handle potential conflicts of interest of editors, authors, and reviewers.	The journal states a conflicts of interest policy, but the description of how conflicts will be handled is unclear.	The journal does not state a conflicts of interest policy.
Journal website	The journal website is competently designed and functional. (examples: no broken links, easy navigation, no missing information)	The journal website is adequately designed with passable functionality. (examples: adequate navigation, few broken links, some missing information)	The journal is poorly designed and is not functional. (examples: broken links, poor navigation, missing information)
Revenue sources	The journal clearly states its business model. This includes any revenue sources, like author fees, subscriptions, advertising, reprints, institutional support, and organizational support.	The journal's business model lacks clarity when stating its revenue sources, like author fees, subscriptions, advertising, reprints, institutional support, and organizational support.	The journal does not state its business model.
Journal archive	The journal website contains an archive of its past issues with links to full text articles.	The journal website contains an archive but it may be incomplete or does not contain links to full text articles.	The journal does not have an archive of its past issues.
Publishing schedule	The journal clearly states how often its issues will be published each year and this agrees with the archive.	The journal does not state how often its issues will be published but it can be determined from the archive.	The journal does not state how often its issues will be published each year and it cannot be determined from the archive.
Author fees	The journal clearly states the amount of money an author will pay to have each article published.	The journal states that an author fee is required but does not note how much it is.	The journal does not state whether or not there are any author fees.
Copyright information	The journal clearly describes its copyright and licensing information on the journal's Web site, and licensing terms are indicated on the published articles (HTML/PDF).		Copyright and licensing information is not found on the journal's Web site and on any published articles.
Journal index	The journal is indexed in more than one subject database. (examples: ERIC, Google Scholar, Web of Science, PsycINFO)	The journal is indexed in one subject database. (example: ERIC)	The journal is not indexed in a subject database.
Access to journal articles	The journal provides full text access to all published articles.	The journal provides full text access to some published articles.	The journal does not provide full text access to any published articles.
Number of articles published	The journal has published more than 10 articles.	The journal has published between 6 and 10 articles.	The journal has published 5 or fewer articles.
Step 2. Publisher evaluation			
Web search for the publisher	The publisher is within the top 5 entries on the first page of search results and there are no scam alert postings.	The publisher is on the first page of search results but not within the top 5 entries and there are no scam alert postings.	The publisher is not on the first page of search results or there is at least one scam alert posting.
Publisher information	Information about the ownership/management of the journal and contact information about the publisher is clearly identified.	Information about the ownership/management of the journal or contact information about the publisher is clearly identified.	Information about the ownership/management of the journal and contact information about the publisher is not available.

Journal Evaluation
Scoring Sheet

Criterion	Rationale	Rating (3, 2, 1)	Notes/Comments, URL where the information is found
Web search for the journal	We want the popular reputation of the journal to be credible.		
Journal name	We want the journal name to be easily distinguishable from any other journal.		
Editorial board	We want to be able to know the names and affiliations of the members of the editorial board.		
Review process	We want to know if the journal is peer reviewed/edited and what the review policy is.		
Conflicts of interest	We want a clear conflicts of interest policy, including how a journal will handle potential conflicts of interest of editors, authors, and reviewers.		
Journal website	We want the journal website to be competently designed and functional.		
Revenue sources	We want to know if a journal is sustainable by its stated business model and sources of revenue.		
Journal archive	We want to be able to access the full text of published articles.		
Publishing schedule	We want to be able to determine the consistency of the journal.		
Author fees	We want to know if an author must pay a fee, and how much the fee is, to publish in the journal.		
Copyright information	We want to be able to read about any copyright or licensing information.		
Journal index	We want to know where the journal may be indexed.		
Access to journal articles	We want to know if we have full text access to all published articles.		
Number of articles published	We want to determine how long the journal has been in existence.		
Web search for the publisher	We want the popular reputation of the Publisher to be credible.		
Publisher information	We want to be able to contact the Publisher and verify ownership/management.		
		0	Rating total
Guide to interpretation	48-39 Good: Within this range the journal meets many of the Open Access Journal Evaluation criteria defined for credibility. At the higher end of the range the journal would be described as recommended.		
	38-27 Fair: Within this range the journal meets some of the Open Access Journal Evaluation criteria defined for credibility. The author would need to decide whether or not to publish in the journal.		
	26-16 Poor: Within this range the journal meets the fewest of the Open Access Journal Evaluation criteria defined for credibility. This journal would not be described as recommended.		

Appendix 3: Training evaluation questionnaire

Q1: What are the three most important categories of science fraud? Please tick three and only three.

1. Plagiarism___
2. Publishing in a predatory journal___
3. Fabrication___
4. Falsification___
5. Gift writing___

Q2: What does HARK stand for? Write out in full.

_____

Q3: If a paper doesn't have an impact factor, does that mean it is predatory?

- Yes____
- No____

Q4: How did you find the length of the course?

Too long_____ Too short_____ About right____

Q5: How did you find the difficulty of the material?

Too hard_____ Too easy_____ About right____

Q6: What was the most important or interesting thing you learned?

_____